




# “Dual incentives in earnings management: Threshold meeting and tax-motivated profit suppression”

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# DUAL INCENTIVES IN EARNINGS MANAGEMENT: THRESHOLD MEETING AND TAX-MOTIVATED PROFIT SUPPRESSION<sup>1</sup>

## Abstract

A common assumption in corporate finance is that firms maximize profits. However, in countries with weak tax administration and limited contract enforcement, firms may understate reported pre-tax earnings to reduce tax liabilities through evasion. This paper revisits the canonical threshold-based earnings management framework and extends it by incorporating an additional (often illegal) incentive to reduce corporate income payments. Simulation results indicate that manipulation does not significantly change when latent earnings are negative. In contrast, when latent earnings are moderately positive, firms combine legal earnings management with illegal underreporting to reduce reported earnings for two purposes: (i) to shift earnings forward to increase the likelihood of meeting next-period benchmark and (ii) to lower current tax payments. At higher earnings levels, both channels plateau as manipulation costs, marginal legal costs, and detection risk increase. Using distributional (histogram-based) diagnostics, discontinuity tests, and a Probit regression model, we find that Ukrainian companies in 2024 were more focused on reducing taxable income than on beating the zero-earnings benchmark. Excess mass is concentrated in the first positive bin, and it is associated with a higher effective tax rate and lower discretionary accruals. Overall, the results suggest that in weak-enforcement settings, tax-motivated earnings suppression can dominate classic threshold-beating incentives.

## Keywords

earnings management, threshold meeting, behavioral finance, earnings suppression, tax evasion

## JEL Classification

G41, G30, H26, M41, D22

## INTRODUCTION

Earnings play a crucial role in business, corporate finance, and capital markets. It is a long-standing finding (e.g., Easton et al., 1992) that earnings are the key determinant of companies' stock returns over medium- and long-term horizons. Expectations for future earnings also drive stock market performance (Kothari & Sloan, 1992). Moreover, even within short horizons (up to one year), earnings can explain an essential share of stock returns. As a result, in addition to the standard objective of generating cash flows (e.g., dividends), corporate executives have a strong incentive to maximize reported earnings (pre-tax profit) to boost shareholders' returns. While major changes in earnings are driven by fundamentals, they can be manipulated (at least to some extent) via different accounting methods and techniques. For example, selecting a particular inventory valuation method, different approaches to revenue recognition, allowances for bad debt, lease accounting choices, and expenditures on research and development – these and other items can allow managers to report earnings that differ from underlying (latent) performance.

<sup>1</sup> Generative AI statement. A generative AI tool (ChatGPT) was used to improve the grammar, clarity, and readability of the manuscript and abstract. The author reviewed and edited all outputs and takes full responsibility for the content.



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### Conflict of interest statement:

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Burgstahler and Dichev (1997) and Degeorge et al. (1999) represent seminal papers that evaluate earnings manipulation with a particular focus on so-called threshold-meeting behavior. Companies may want to report non-negative earnings. In particular, when latent earnings are negative but small in magnitude, accounting manipulations may help to boost them to zero or slightly above it. Similarly, companies may want to meet or exceed last period's earnings or financial analysts' expectations.

The scientific problem underpinning this study is that the standard threshold-meeting diagnostics (excess mass and discontinuity at zero earnings) are not uniquely attributable to benchmark-driven upward earnings management. Firms may not only try to increase reported earnings to meet a benchmark but also suppress reported earnings to reduce tax liabilities. This is especially important when capital markets are underdeveloped, financing is more relationship-based or collateral-based rather than earnings-based, and contract enforcement is weak. In such circumstances, firms may prefer to understate reported earnings to reduce corporate income tax payments. Consequently, the objective of the paper is to fill this gap by extending the canonical Degeorge et al. (1999) earnings manipulation threshold model with an additional incentive to evade corporate income taxes and test it using the data on Ukrainian firms. We examine two hypotheses:

*H1: Firms use accounting manipulations to report small positive earnings rather than losses.*

*H2: Firms use illegal manipulations to suppress positive earnings toward zero in order to evade corporate tax payments.*

## 1. THEORETICAL BASIS

There are different approaches to modeling and analyzing the process of earnings management to exceed the thresholds and evade tax payments.

### 1.1. Review of the key approaches

The studies that model earnings management thresholds can be classified into two dimensions: those grounded in an explicit theoretical model and those dedicated to the jurisdictions with different strengths of the tax-enforcement and legal environments. The former includes (i) studies that derive threshold incentives from microeconomic models and then test them empirically or (ii) purely empirical papers that estimate regressions without explicit theoretical foundations. In terms of institutional setting, some countries have strong, enforceable tax rules, whereas in others, tax evasion is relatively widespread and the probability of detection is low.

The results of many papers are mixed. Classical articles on developed economies usually strongly support the presence of different earnings thresholds that managers care about. Nevertheless, findings may vary across countries, firm samples, and

the degree of alignment between financial reporting and tax rules. For example, Tran and Duong (2020), using data on exchange-traded firms, confirmed the presence of earnings management to avoid small losses but rejected a tendency to avoid earnings decreases. The tools used include working-capital manipulation and discretionary accruals. Similar mixed results were obtained by Santana and Sarquis (2021), who applied the methodology from Burgstahler and Dichev (1997) to more than 38,000 firms from 116 countries over 1996–2017.

Methodology also varies substantially: from univariate distributional analyses, through multivariate regression including binary choice models such as Probit, to less common approaches. For example, Durana et al. (2020) employed the Dickey-Fuller test for a unit root. They argued that if financial indicators are non-stationary, it may signal the presence of financial reporting management rather than random variation.

#### 1.1.1. Tax-motivated reporting

One of the first papers to focus on the combined incentives to report positive earnings and to decrease them to reduce taxes was the work by

Coppens and Peek (2005). They analyzed private companies from eight Western European countries and compared the distribution of net income with that of corresponding public companies. They applied an empirical methodology similar to Burgstahler and Dichev (1997) and Degeorge et al. (1999), testing for discontinuities at zero earnings, changes in earnings, and incentives to reduce earnings and, consequently, income tax liabilities. It was shown that private firms do care about not reporting small negative values; however, they are less focused on managing earnings decreases. Even though private firms do not have as much capital market pressure as public companies in terms of reporting their financial results, both groups still exhibit broadly similar patterns. In selected countries where financial and tax accounting standards were remarkably similar (Belgium and Italy), the earnings distribution is heavily bunched just above zero, consistent with tax-motivated earnings suppression rather than loss avoidance alone. Although the authors tested multiple thresholds (both loss avoidance and earnings decreases), some conclusions were based on comparison with private firms, which helps to highlight the difference in manipulation; however, the approach limits the ability to quantify the absolute magnitude of misreporting.

Goncharov and Zimmermann (2006) assessed three key hypotheses. First, they found that higher marginal tax rates increase the probability of downward earnings management to minimize income tax paid. Second, private companies manage taxes more aggressively than public firms. Third, when financial-tax reporting alignment decreases, the reporting behavior of private firms remains generally unchanged; however, the extent of tax management by public companies decreases. These results were supported by both univariate and multivariate analyses. Net income distribution in the histogram was evaluated for discontinuities, and then Probit regression models were estimated to support the conclusion with additional insights. While it is one of the first studies to analyze tax management in an emerging economy, it is primarily empirical and does not use a clear theoretical framework to explain the joint role of threshold-meeting behavior and tax-motivated reporting.

Badertscher et al. (2009) collected a sample of firms that later restated earnings upward, implying that original reports were understated and companies were engaged in downward earnings management. Having estimated a pooled cross-sectional Probit model, the authors concluded that the most likely explanation for the misstatement was not a desire to minimize taxes but rather other reasons, such as the creation of cookie jar reserves, lowering the stock price for subsequent repurchases, or insider trading. Two motivation paths were suggested for managing earnings downward: tax-related and non-tax-motivated. The former is usually represented by high book-tax conformity (when financial and tax-based incomes are close enough) and involves real transactions management; however, it did not lead to earnings restatements. The latter describes the situation of low book-tax conformity with nominal transaction management (e.g., accruals) and a positive probability of restatement. Despite such detailed analysis of downside earnings management, all results are based on pure empirical models, which may lack a unifying theoretical framework.

Selected papers exploit institutional changes that alter firms' incentives, particularly tax-law reforms. Marques et al. (2011) focused on the analysis of Portuguese firms that were obliged by the 1999 decree to pay taxes in advance – the so-called “special payment on account” (SPA). The minimum and maximum tax values were set at significantly higher levels: €1,250 and €200,000, respectively, since 2003. Companies whose SPAs fell in this interval had larger discretionary accruals than other firms. The authors interpret this as evidence of tax-motivated reporting discretion. Higher tax rates led to larger manipulation and reductions in reported net income. Finally, the authors provide policy recommendations on how to reduce large-scale tax evasion by private companies.

More recent studies dedicated to developing economies include the academic paper of Almulhim and Metwally (2025). They show that for Egyptian listed non-financial firms, tax avoidance is positively associated with earnings manipulation. The latter was proxied with discretionary accruals that were calculated based on the modified Jones model – Dechow et al. (1995) modification of the Jones (1991) model. However, tax avoidance measured

as a ratio of tax expenses and pre-tax income may not be the best indicator since positive earnings management can lower the effective tax rate by increasing its denominator. In addition to the standard tests, the impact of board composition on the relationship between earnings management and tax avoidance was estimated. This link was moderated when the board of directors is more diverse (more women present) and has more independent members.

### 1.1.2. *Alternative explanations*

It should be mentioned that there are alternative explanations for bunching just above zero. Beaver et al. (2007) provided a non-standard explanation for a kinked distribution of earnings near zero, arguing that they may arise from mechanical accounting effects rather than manipulation. They considered two sources that are driving earnings to just above zero and away from below-zero values. There is an asymmetry in how financial items influence companies with profits versus losses. Namely, profitable companies face taxes that reduce their net income to zero. Companies with losses are more likely to report large negative special items such as restructuring costs, litigation settlements, losses from natural disasters, and so on. These mechanisms can move observations away from small losses and increase the apparent discontinuity at zero.

### 1.1.3. *Game theory modeling*

Most of the studies above are primarily empirical and often lack explicit theoretical foundations. Niggemann (2024) developed a game theory model that tries to explain tax avoidance behavior under various levels of book-tax conformity. There is a manager who governs the company on behalf of shareholders. At the first step, he observes financial earnings and decides the amount of manipulation to provide the official reported value. Next, he files a specific amount of taxes. At the third step, the auditor observes both reports and decides whether to conduct an inspection or not (level of effort). If violations are found, a penalty exceeding the true tax liability will be charged. Finally, players receive payoffs. The equilibrium state produces interesting results. In particular, increasing book-tax conformity reduces the degree of earn-

ings manipulation and tax evasion. The intuition is that when conformity is low, large discrepancies between book and tax reports provide a stronger signal of evasion, prompting greater audit effort. Managers are anticipating this and are reducing manipulation to avoid penalties. Finally, combating financial reporting misrepresentation helps to reduce tax avoidance; however, counterintuitively, strengthening tax enforcement itself may lead to the deterioration of financial reporting since the manager will try to reduce tax payments less but will strive to report maximum financial profit. This article develops a rigorous theoretical model; however, it ignores typical thresholds such as loss avoidance and does not evaluate the results empirically.

### 1.1.4. *Behavioral foundations of thresholds*

The presence of classical thresholds, such as loss avoidance, can be explained by prospect theory concepts from behavioral finance (Kahneman & Tversky, 1979). In contrast to traditional finance, in prospect theory, decisions are made not based on the absolute level of wealth but rather on changes relative to a reference point. The reference point can be zero, past, or expected profits. Next, due to loss-aversion bias, losses may be perceived as substantially more painful than equally sized gains, inducing financial market players to take riskier decisions to avoid them. In addition, there are other biases that may contribute to the desire to beat the threshold. For example, framing bias when stakeholders may frame a loss as a negative signal, while a small profit is perceived as a positive outcome – even when the difference is economically negligible (e.g.,  $-\$1$  versus  $+\$1$ ).

While existing literature provides important insights into earnings management and profit suppression, key papers usually focus on one of the incentives and lack a solid theoretical foundation. For example, Burgstahler and Dichev's (1997) seminal research analyzed upward earnings management to achieve positive or increasing profit; however, it lacks a rigorous underlying model, stating only that discontinuity around zero is caused by information-processing heuristics or the steep nature of the prospect value function at the reference point. Goncharov and Zimmermann (2006) extended the empirical model by considering both

incentives to show positive profit and reduce taxes, but no theoretical model was proposed. This gap is addressed in the current paper, where tax-motivated downward reporting is structurally disentangled from the classical zero-earnings threshold within a unified model. Specifically, we extend the Degeorge et al. (1999) threshold model by adding a tax-evasion incentive, so the model can explain both upward manipulations to avoid losses and downward manipulations to reduce taxes. We then test the model on Ukrainian firm-level data.

### 1.2. Theoretical model setup

We extended Degeorge et al.'s (1999) two-period theoretical model by introducing the incentive to suppress reported earnings to evade corporate income tax payments. In practice, it can be implemented through schemas such as ghost invoicing (artificial purchases from lower-tax counterparties) or a revenue-splitting (dropping) mechanism when sales are shifted to entities with preferential tax regimes (e.g., single entrepreneurs). In that case, revenue is distributed among entities with lower tax rates (a supermarket chain registering revenue on single entrepreneurs) and so on. Carrillo et al. (2023) found that 5% of Ecuadorian firms (14% of transactions) engage in fake ghost purchases that allow for value-added tax (VAT) and corporate income tax deductions. In the Ukrainian context, Dubrovskiy et al. (2025) estimated that tax budget losses from revenue understatement in 2024 through dropping are around \$0.5 billion and from ghost invoicing to avoid profit and dividend tax payments around \$0.7 billion, which in total exceeds 1% of total government budget revenues. We assume that the benefit from tax evasion equals the difference between the firm's effective tax rate and the counterparty's tax rate, which captures the economic logic of ghost invoicing.

#### 1.2.1. Deterministic specification

As in the original paper by Degeorge et al. (1999), the manager faces true latent earnings  $L_1$  and  $L_2$  in each period, which are normally distributed with zero mean and standard deviation  $\sigma$  set to 10, and they are uncorrelated. Then, the manager considers two manipulations in period 1:  $M$  and  $M^T$ . The first one is legal, and its goal is to modify reported earnings so that they are increasing and

bonus  $B$  can be earned when reported earnings  $R_{t+1} \geq R_t$ . We set  $R_0 = 0$ , which allows to model the threshold of achieving positive earnings in period 1:  $R_1 \geq 0$ . The resulting benchmark earnings are  $R_1^* = L_1 + M$ . The second manipulation that we introduce in this paper is an illegal non-negative value  $M^T$  whose goal is to reduce the taxable amount. As a result, reported earnings in period 1 are equal to this expression  $R_1 = R_1^* - M^T$ . We assume that suppressed profit  $M^T$  would have been taxed at the corporate income rate  $\tau^{CIT}$ , but is instead evaded by artificially created expenditures via purchases of goods or services from a single entrepreneur who faces a tax rate  $\tau^{SE} < \tau^{CIT}$ . The net benefit of manipulation is  $\tau = \tau^{CIT} - \tau^{SE}$  per unit evaded or  $\tau M^T$  as a total tax benefit with  $0 \leq M^T \leq R_1^*$ .

Manipulations are not free of charge. The legal one can be positive or negative (shifting earnings intertemporally), and the next period cost (or benefit for negative value) will be  $k(M) = e^M - 1$ . Illegal manipulation can be detected with probability  $p^{det} = 1 - e^{-\gamma M^T}$ , where  $\gamma$  measures how quickly detection probability increases as  $M^T$  increases. The resulting fine is proportional to the evaded tax amount  $F = f^m \tau^{CIT} M^T$  where  $f^m$  is the penalty multiplier, and the fine is paid in the next period. Next period reported earnings will be  $R_2 = L_2 - k(M)$  if tax manipulation is not detected and  $R_2 = L_2 - k(M) - F$  otherwise. Corresponding probabilities of receiving a bonus in period 2 are as follows:

$$\begin{aligned}
 p_2^0 &= Prob(L_2 - k(M) \geq R_1) \\
 &= Prob(L_2 \geq R_1 + k(M)) \\
 &= 1 - \Phi\left(\frac{R_1 + k(M)}{\sigma}\right),
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 p_2^1 &= Prob(L_2 - k(M) - F \geq R_1) \\
 &= 1 - \Phi\left(\frac{R_1 + k(M) + F}{\sigma}\right),
 \end{aligned} \tag{2}$$

where  $\Phi(x)$  is the standard Normal cumulative distribution function. The resulting probability that  $R_2 \geq R_1$  is

$$p_2 = (1 - p^{det}) p_2^0 + p^{det} p_2^1. \tag{3}$$

Assuming discount factor  $\delta = 1$  and taking into account the above assumptions, the manager will try to maximize the following payoff function by selecting the degree of legal and illegal manipulations  $M$  and  $M^T$ :

$$\max_{M, M^T} U = R_1^* - k(M) - p^{det} F + \tau M^T + B \mathbb{1}(R_1 \geq 0) + p_2 B, \quad (4)$$

where  $\mathbb{1}(x)$  is the indicator function taking values 1 or 0 depending on whether the condition holds.

### 1.2.2. Stochastic specification

The baseline (previous) model is deterministic: when random latent earnings are realized, the manager observes them perfectly and chooses the reported value by selecting the manipulation amount. In line with Degeorge et al. (1999), we assume that there is measurement noise, and the manager can observe only imprecise latent earnings  $L_1 = L_1 + \varepsilon$ , where  $\varepsilon \sim N(0, \sigma_\varepsilon^2)$  and  $\sigma_\varepsilon^2$  is calibrated to 1. The manager, therefore, makes decisions under uncertainty. That is why we have the probability of exceeding the threshold ( $R_1 \geq 0$ ) in period 1, defined as

$$\begin{aligned} p_1 &= Prob(\widehat{L}_1 - \varepsilon + M - M^T \geq 0) \\ &= Prob(\varepsilon \leq \widehat{L}_1 + M - M^T) \\ &= \Phi\left(\frac{\widehat{L}_1 + M - M^T}{\sigma_\varepsilon}\right). \end{aligned} \quad (5)$$

We also need to modify probabilities (1) and (2) as follows:

$$\begin{aligned} p_2^0 &= Prob(L_2 - k(M) \geq \widehat{L}_1 - \varepsilon + M - M^T) \\ &= Prob(L_2 + \varepsilon \geq \bar{R}_1 + k(M)) \\ &= 1 - \Phi\left(\frac{\bar{R}_1 + k(M)}{\sqrt{\sigma^2 + \sigma_\varepsilon^2}}\right), \end{aligned} \quad (6)$$

$$\begin{aligned} p_2^1 &= Prob(L_2 - k(M) - F \geq \widehat{L}_1, \\ &- \varepsilon + M - M^T) = 1 - \Phi\left(\frac{\bar{R}_1 + k(M) + F}{\sqrt{\sigma^2 + \sigma_\varepsilon^2}}\right) \end{aligned} \quad (7)$$

where  $\bar{R}_1 = \widehat{L}_1 + M - M^T = R_1 + \varepsilon$  is the mean reported earnings.

The resulting maximization problem is:

$$\begin{aligned} \max_{M, M^T} U &= \bar{R}_1^* - k(M) - p^{det} F + \tau M^T \\ &+ p_1 B + p_2 B, \end{aligned} \quad (8)$$

where  $\bar{R}_1^* = \widehat{L}_1 + M$  and  $p_2 = (1 - p^{det})p_2^0 + p^{det}p_2^1$  based on  $p_2^0$  and  $p_2^1$  from (6) and (7), respectively.

## 1.3. Empirical methodology

Having solved the optimization problems of the proposed theoretical model and conducted simulations, we will test its predictions with the methodological approaches outlined below. If firms try to report positive earnings and to evade tax payments, we expect to observe an abnormally high number of firms with earnings just above zero. This behavior can be examined using histogram-based and regression analyses.

### 1.3.1. Histogram-based analysis

To plot firms' earnings on the histogram, we first define the Freedman and Diaconis (1981) bin width as follows:

$$A = 2 \cdot IQR \cdot N^{\frac{1}{3}}, \quad (9)$$

where  $IQR$  is the interquartile range – the difference between the third and first quartiles, and  $N$  is the number of observations.

To check for discontinuities, we compute the test statistics suggested by Degeorge et al. (1999) for each bin:

$$\tau_j^{bin} = \frac{\Delta p_j - \mu_j}{\sigma_j}, \quad (10)$$

where  $\Delta p_j$  is the difference between two consecutive bins  $j$  and  $j-1$ ,  $\mu_j$  and  $\sigma_j$  are the mean

and standard deviation of  $\Delta p_j$ , respectively, computed using 10 preceding and 10 subsequent values but excluding  $\Delta p_j$  itself.

### 1.3.2. Regression model

If firm earnings fall into the first bin located just above zero, we can test whether this is associated with the changes in discretionary accruals (incentive to report positive earnings) or high corporate tax pressure (incentive to evade tax payments). Discretionary accruals capture legal earnings management since they are related to accounting adjustments permitted under legal reporting standards. On the other hand, illegal tax evasion cannot be observed and, therefore, it is proxied by a tax pressure indicator (average income tax rate, AITR), implying that companies with a higher tax burden have stronger incentives to reduce reported earnings and subsequent income tax payments. In summary, if a firm has a high AITR and is more likely to report a small positive profit not explained by discretionary accruals, we interpret this as evidence of tax-motivated earnings suppression.

We calculate total accruals as the difference between profit before taxes and cash flows from operating activities:

$$TA_i = PBT_i - CFO_i. \tag{11}$$

Discretionary accruals are calculated using the modified Jones model (Dechow et al., 1995):

$$TA_i = \alpha_0 + \alpha_1(\Delta REV_i - \Delta REC_i) + \alpha_2 PPE_i + \varepsilon_i, \tag{12}$$

where  $\Delta REV_i$  and  $\Delta REC_i$  are the changes in revenue and net receivables over the year, respectively,  $PPE_i$  is the property, plant, and equipment at the end of the year. All variables are scaled by the beginning-of-the year total assets. Having estimated the regression model with the ordinary least squares method, discretionary accruals  $DA_i$  will be defined as the residuals  $\varepsilon_i$ .

Next, the probability that a company belongs to the first positive bin(s) is estimated via a Probit regression as follows:

$$EM_i = \Phi \left( \begin{aligned} &\beta_0 + \beta_1 DA_i + \beta_2 \ln(A_i) \\ &+ \beta_3 AITR_i + \sum_{j=1}^7 \beta_4^j Ind_i^j + \varepsilon_i \end{aligned} \right), \tag{13}$$

where  $\Phi(x)$  is the standard Normal cumulative distribution function,  $DA_i$  is the discretionary accruals estimated based on (12),  $A_i$  is the total assets, and  $AITR_i$  is a dummy variable measuring tax pressure and taking value 1 if the average income tax rate is above the tax limit (20% or 22%), and  $Ind_i^j$  is the industry dummy variable that equals to 1 for industry  $j$  (seven industries with one omitted to avoid multicollinearity). The model will be estimated using robust Huber-White heteroskedasticity-consistent standard errors.

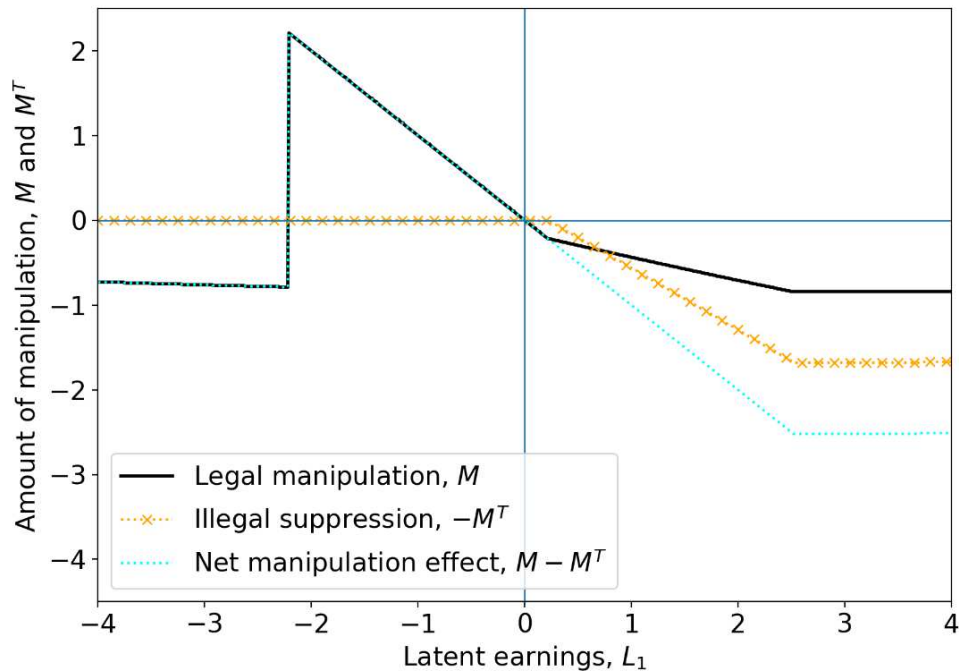
## 2. RESULTS

This section presents the results from theoretical simulations and empirical analysis. We first solve the manager's optimization problem and illustrate how the introduction of tax-motivated profit suppression changes optimal manipulation. Then, we compare simulated earnings distributions with empirical evidence from Ukrainian firms and test the sources of manipulation using regression analysis.

### 2.1. Simulation

The bonus value  $B$  is calibrated to 10 as in Degeorge et al. (1999). Based on the Ukrainian tax rate, the corporate income tax rate is  $\tau^{CIT} = 0.18$  and the single entrepreneur tax rate is  $\tau^{SE} = 0.05$  with their difference  $\tau = 0.13$ . The fine multiplier  $f^m$  is set to 3. The relationship between the detection probability and the parameter  $\gamma$  is shown in Figure A1 in the Appendix. We use the value of 0.3, which implies that a tax-evasion manipulation of 4 units yields an approximate 70% detection probability.

Having solved the maximization problem (4), we determine the optimal legal,  $M$ , and illegal,  $M^T$ , manipulations for different latent earnings,  $L_1$  (Figure 1). When latent earnings are negative, the manager does not have an incentive to reduce them to avoid paying income tax. In this region,



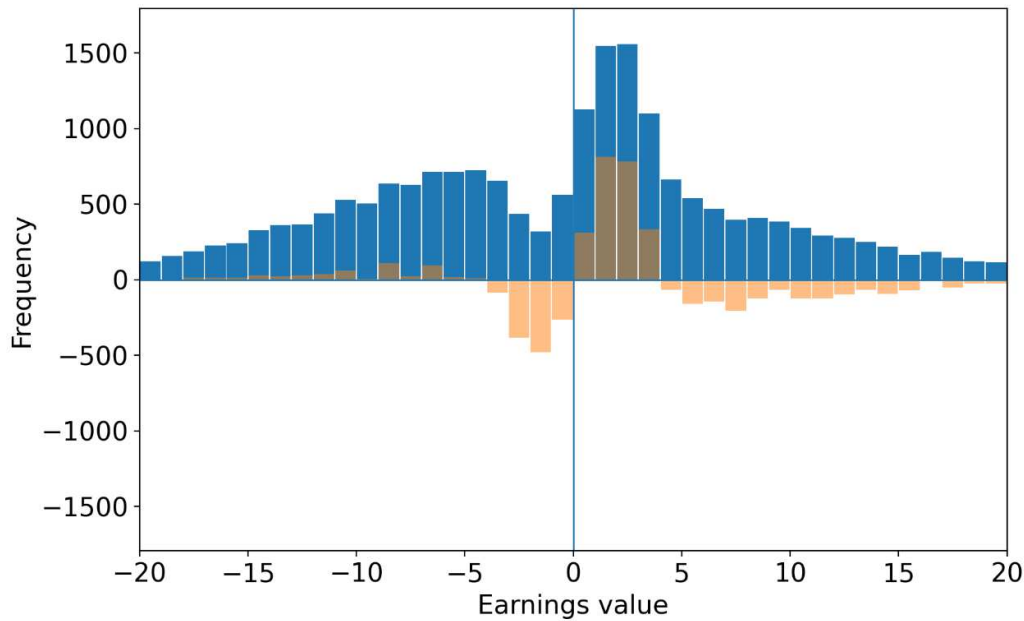
**Figure 1.** Earnings manipulation

two scenarios are possible, and they coincide with the DeGeorge et al. (1999) outcomes. First, when profit is exceptionally low, the manager could increase it to zero to exceed the threshold; however, such large manipulation is costly in the next period. Instead, the manager decreases earnings further to save for the future and reach the threshold in the next period. Starting from latent losses at  $-2.2$ , we see a 45-degree line, implying that all losses are manipulated and reported earnings equal zero; thus, the threshold is achieved and the bonus is guaranteed.

When small positive latent earnings are generated ( $\leq 0.2$ ), they are legally reduced toward zero, which still allows the manager to receive a bonus in period 1, and also shifts earnings forward to increase the probability of the bonus next period. Illegal manipulation remains at zero until this moment since the reported profit is zero, and no taxes should be paid. Next, when earnings increase further, we see that legal manipulation increases (by absolute value) but at a slower rate as the slope becomes flatter – this is the key difference from DeGeorge et al. (1999). At the same time, illegal suppression increases at a constant speed, and the net manipulation effect still follows a 45-degree line driving profit toward zero. The manager achieves three goals: (i) cumulative

manipulation keeps reported profit at zero, guaranteeing the bonus in period 1, (ii) negative legal manipulation increases the probability of reaching the threshold in period 2, and (iii) illegal tax manipulation generates an additional payoff by evading corporate income tax payments. This behavior continues until profit reaches 2.50 for legal and 2.52 for illegal manipulations, after which they become constant. There is no incentive to transfer profit for the next period using legal changes since costs are too high. Further tax evasion also stops because the detection probability becomes prohibitively high.

Next, we ran 20,000 simulations for latent earnings, solved the optimization problem (8) both with and without tax evasion, and built histograms (Figure A2 and Figure 2) of reported earnings ( $R_1$  drawn in blue) and the difference between latent and reported earnings ( $R_1 - L_1$  drawn in orange). In the baseline scenario (DeGeorge et al., 1999: Figure A2), we see that the number of companies with the reported earnings just below zero is much smaller than expected under normally distributed latent earnings. In line with the behavior described previously, firms manipulate latent earnings to report non-negative profit, leading to a pronounced concentration just above zero. If earnings are very high, according to expectations,



Note: The distribution of reported earnings is shown in blue, and the difference between the distributions of latent and reported earnings is shown in orange.

**Figure 2.** Simulated distribution of reported earnings: extended scenario

firms reduce them to some extent to save for the future, which is why the orange bars are negative in the upper tail.

Now, we consider the extended scenario in Figure 2 when the manager not only tries to exceed the zero profit threshold but also wants to minimize earnings illegally to pay less corporate income tax. When profit is negative, both scenarios are similar; for example, the total number of firms in the first four negative bins near zero is 1,976 and 1,973 in the baseline and extended models, respectively.

Moving to the positive area, there are two new phenomena. First, in the region of high profit, many more firms than in the baseline scenario under-report earnings to evade taxes. Second, the number of firms just above zero is also much higher in the extended model: more than 1,500 firms per bin, compared to around 1,250 in the baseline scenario. The total number of firms in the first four positive bins is 5,331 in the extended scenario and 4,336 in the baseline. As a result, the discontinuity between low and high profits increases, and observing such a pattern in empirical data would be consistent with tax-evasion-driven manipulation of reported earnings. We test this implication empirically in the next subsection.

## 2.2. Sample construction

We use financial reporting data published by the State Statistics Service of Ukraine (2025) on the Open Data Portal. It is updated every month, and we selected 2024 reports submitted during the first 11 months of 2025 (a total of 577,047 files), including Balance Sheets, Income Statements, Cash Flow Statements (direct and indirect methods), Statements of Changes in Equity, Notes and Appendices to the Annual Financial Statements, and Financial Reports for Small and Micro-Enterprises. Following the start of Russia's full-scale invasion in 2022, the State Statistics Service of Ukraine allowed firms to postpone statistical reporting. Mandatory submission was reinstated on July 5, 2025, and firms that had not reported for 2022–2025 were required to file outstanding reports by October 5, 2025. Companies must submit their reports online and can do so multiple times by correcting mistakes until the deadline. We retain the latest annual filing, which results in 488,576 files. Next, we exclude state-owned and government organizations, various non-governmental organizations (NGOs), small and micro-firms, and focus on joint-stock companies and limited liability companies: there are 8,673 and 1,815 enterprises, respectively. Then, companies

**Table 1.** Median financial indicators

Industry	Total Number	Asset Turnover	Pre-tax ROA, %	After-tax ROA, %	Total Accruals / Assets, %	Effective Tax Rate, %
Total	3,744	1.7	6.2	5.1	3.5	18.05
Wholesale and retail trade	1,486	2.5	6.7	5.5	4.9	18.05
Manufacturing	1,366	1.5	6.8	5.6	4.2	18.07
Transportation and storage	230	1.3	3.8	3.0	-0.5	18.17
Construction	207	1.0	3.0	2.4	2.0	18.03
Real estate	135	0.3	3.7	3.1	0.1	18.00
Professional, scientific, and technical activities	122	1.4	5.5	4.5	1.9	18.13
IT and telecommunications	117	2.0	11.1	9.1	7.3	18.03
Administrative and support services	81	1.5	5.3	4.3	2.1	18.01

from the financial services industry, agriculture, and selected small industries were removed. We restricted the sample to firms with active businesses having annual revenue of at least €1 million (around \$25,000). Finally, we remove outliers based on the 99<sup>th</sup> percentile of absolute values. The resulting sample size is 3,744 companies in total.

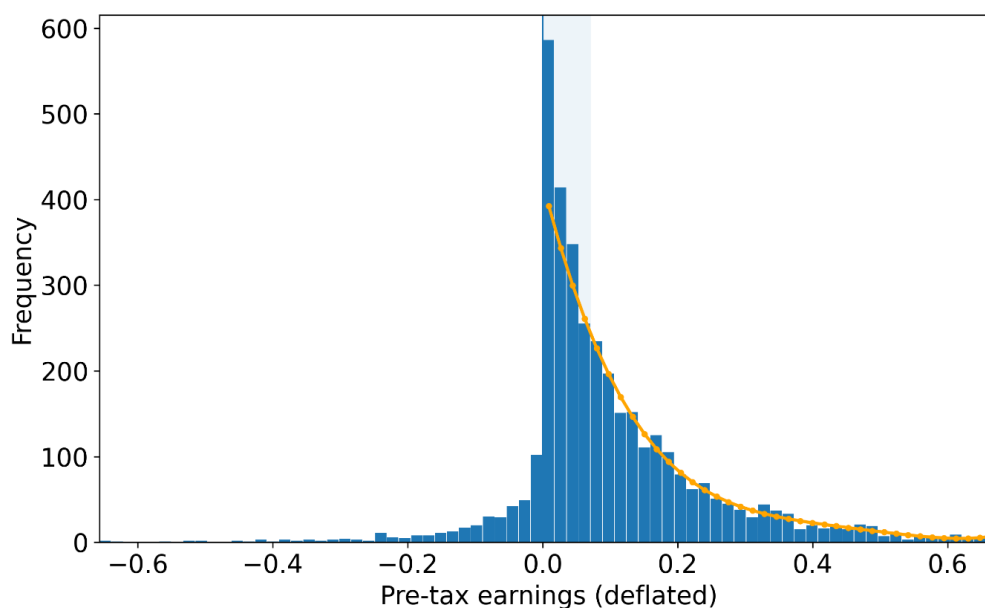
The most widespread industry is wholesale and retail trade, representing almost 40% of the sample. The next large industry is manufacturing, accounting for 36% of observations, while the remaining share varies from 2% to 6%. Ninety percent of firms reported positive pre-tax profit, and the remaining 10% reported losses. As can be seen from Table 1, the highest return on assets (ROA) was reported by IT and telecommunications at

9.1%, while the lowest median ROA was in construction. The median effective tax rate for most firms was very close to 18%, which corresponds to the corporate income tax rate. As expected, the highest asset turnover is in trade.

The median deflated value of total accruals (scaled by total assets) was 3.5%. The median asset tangibility ratio (property, plant, and equipment divided by total assets) was close to 10%.

### 2.3. Empirical findings

Based on the bin width (9) that was calculated as 0.0178, the constructed histogram of pre-tax earnings deflated by beginning-of-period total assets is shown in Figure 3. We can clearly see that the



*Note:* The distribution of reported earnings is shown by blue bins, the orange curve represents a fourth-degree polynomial fitted to the fifth and subsequent bins and extrapolated toward zero.

**Figure 3.** Histogram of reported earnings (deflated by total assets): empirical distribution

height of the first positive bin is significantly larger than its neighbors. The discontinuity measure calculated based on (10) equals 10.40 and is statistically significant. The test statistics for the second, third, and fourth bins are 1.59, 0.59, and 0.83, respectively. We see that discontinuity decreases, and these values are not statistically significant. The first negative bin discontinuity measure is 0.41; however, it is also not significant. In summary, the only statistically significant discontinuity is registered for the first bin  $\tau_1^{bin}$  at 99% confidence interval.

Even though only the first bin is significant, there can still be mass concentration in several consecutive positive bins. To test this possibility, we estimated a fourth-degree polynomial using the fifth and subsequent bins and extrapolated it to the origin. Next, the cumulative difference between actual bin heights and the polynomial was calculated and compared for statistical significance using bootstrap inference. While under this specification, excess mass is still present (even if the first bin is excluded and the next three are considered only), the results are very sensitive to the polynomial degree and the choice of bins used for estimation. Consequently, we treat excess mass beyond the first bin as inconclusive and use it only as a robustness check in the regression analysis.

The results for the regression model (13) are provided in Table 2 (the related modified Jones regression is presented in Table B1 in Appendix B). The core Model 1 is estimated based on an average income tax rate threshold of 20%, and the dependent variable is a dummy equal to one if the company

belongs to the first bin. We can see that both discretionary accruals and AITR are statistically significant, while the logarithm of assets is not. AITR is positively related to the probability of belonging to the first bin. In particular, the marginal effect (Model 1 ME) states that companies facing higher effective tax rates are more likely to be in the first bin by 23.4% relative to firms with a lower tax burden. This is an expected relationship supporting the hypothesis that tax pressure creates an incentive to report lower profits to reduce potential payments. The relationship between DA and the probability of being in the first bin is negative. It signals that firms are more focused on decreasing reported profit to avoid paying taxes than on increasing it to show positive profit. Namely, if DA as a share of total assets increases by 1% in absolute value, the probability of reporting small positive earnings decreases by 16.5%. Other things equal, firms in the construction and real estate industries are more likely to report profits in the first bin, whereas IT and telecommunications, as well as manufacturing firms, are less likely to do so.

For robustness checks, we also estimated Model 2 using an AITR threshold of 22%. Model 3 has the same independent variables as Model 1, while the dependent variable equals one if the company belongs to any of the first three positive bins. The results are consistent with the core Model 1. Lastly, there may be reverse causality between tax pressure (AITR) and earnings management. To address this potential endogeneity concern, we re-estimated the model using lagged AITR that was calculated from the previous year's values reported in the 2024 Income Statements. It reduces the

**Table 2.** Regression results

Variable	Model 1	Model 2	Model 3	Model 4	Model 1 ME
Constant	-1.322***	-1.321***	-0.404**	-1.302***	-
DA	-0.421***	-0.401***	-0.651***	-0.379***	-0.165
Ln (Assets)	0.010	0.013	-0.010	0.018	0.004
AITR	0.828***	0.945***	0.986***	0.369***	0.234
Administrative and support services	0.182	0.179	0.096	0.239	0.045
Construction	0.499***	0.498***	0.533***	0.486***	0.139
IT and telecommunications	-0.724***	-0.739***	-0.622***	-0.739***	-0.112
Manufacturing	-0.114*	-0.117**	-0.068	-0.093	-0.024
Professional, scientific, and technical activities	-0.214	-0.237	-0.188	-0.148	-0.044
Real estate	0.326**	0.320**	0.272**	0.287**	0.085
Transportation and storage	0.003	0.015	-0.153	0.026	0.001

Note: \*\*\* denotes significant coefficients at the 99% confidence level, \*\* – at 95%, and \* – at 90% confidence level.

probability that current earnings manipulation affects past AITR. As can be seen in column Model 4, the results remain qualitatively unchanged compared to the baseline specification Model 1.

### 3. DISCUSSION

In summary, our model produces novel results, especially when earnings are moderately positive: companies use both legal and illegal manipulations to suppress pre-tax profit toward zero, which still allows managers to receive the bonus and avoid paying taxes. In other regions, behavior remains similar to the standard one described in Degeorge et al. (1999).

Relating these results to our hypotheses, the histogram-based diagnostics show a statistically significant discontinuity at the first positive earnings bin, which is consistent with firms bunching just above zero. This pattern is consistent both with threshold-meeting behavior and with tax-motivated suppression toward zero. Second, the regression results directly support tax evasion motives: firms facing higher tax pressure (AITR equals 1) are significantly more likely to report close to zero profits. The negative coefficient on discretionary accruals indicates that accrual-based adjustments are used to reduce reported income. Taken together, these findings suggest that managers prioritize minimizing taxable income over beating the zero threshold for capital-market reasons.

These findings coincide with the papers dedicated to earnings management to avoid taxes. The signs of the DA and AITR coefficients are

the same as the ones estimated, for example, by Marques et al. (2011). Their estimated coefficient on effective tax rate pressure is of similar magnitude to ours; however, the discretionary accruals effect in their empirical analysis is substantially stronger.

While empirical results strongly support the idea of earnings management to avoid income tax payments, support for the psychological threshold-meeting motive of reporting positive earnings emphasized in the original Degeorge et al. (1999) framework is less pronounced in the data. We can plausibly attribute this to the limited capital market development in Ukraine, where companies are not forced to show positive profit to satisfy investor or creditor scrutiny. Consequently, as the next step, it is recommended to run the analysis on a sample design that better isolates capital-market pressure. For example, one could focus on firms with stronger external monitoring (larger firms, firms with bank loans, exporters, or firms with audited financial statements) and test whether the discontinuity near zero becomes stronger in those subsamples.

More broadly, the results presented in the paper are likely to extend beyond Ukraine. Namely, the evidence from developing economies suggests that weaker investor protection, higher ownership concentration, and less developed capital markets reduce external monitoring and market discipline. Future research could extend the analysis to cross-country settings to examine whether firms in such environments place relatively greater emphasis on reducing taxable income than on reporting small positive profits.

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### CONCLUSION

The purpose of this study is to extend the classical earnings management framework by incorporating firms' incentives to suppress earnings to evade corporate income tax payments. It is assumed that tax evasion is an illegal manipulation, and a manager faces a positive and increasing probability (as suppression increases) of being detected by auditors or the tax service authority. The theoretical model and simulations reproduce the standard relationship between latent earnings and the degree of manipulation and introduce an additional effect: earnings are suppressed not only to shift income forward to meet the threshold next period but also to reduce current tax liabilities. Empirical analysis based on Ukrainian firm-level data, in general, is consistent with the theoretical model. It reveals statistically significant discontinuity around zero earnings and shows that firms with a higher effective tax burden are more likely to report close to zero positive profit and exhibit lower discretionary accruals.

The obtained results suggest that earnings management around zero is driven not only by threshold-meeting incentives but also by tax-motivated earnings suppression. This indicates that in environments with weaker market discipline and stronger tax-related incentives, firms may place greater emphasis on reducing taxable income than on reporting higher profitability. Future studies may extend the analysis to firms operating under stronger market pressure (e.g., stock-exchange listed firms or in cross-country samples) to examine whether tax evasion or threshold meeting is more strongly associated with reporting small positive earnings.

## AUTHOR CONTRIBUTIONS

Conceptualization: Roman Semko.  
 Data curation: Roman Semko.  
 Formal analysis: Roman Semko.  
 Funding acquisition: Roman Semko.  
 Investigation: Roman Semko.  
 Methodology: Roman Semko.  
 Project administration: Roman Semko.  
 Resources: Roman Semko.  
 Software: Roman Semko.  
 Supervision: Roman Semko.  
 Validation: Roman Semko.  
 Visualization: Roman Semko.  
 Writing – original draft: Roman Semko.  
 Writing – review & editing: Roman Semko.

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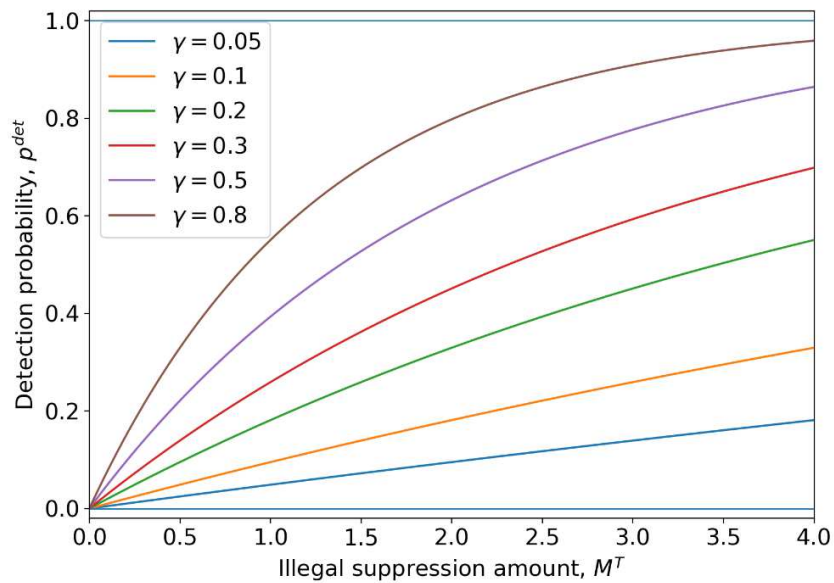
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## APPENDIX A

### PROBABILITY OF DETECTION

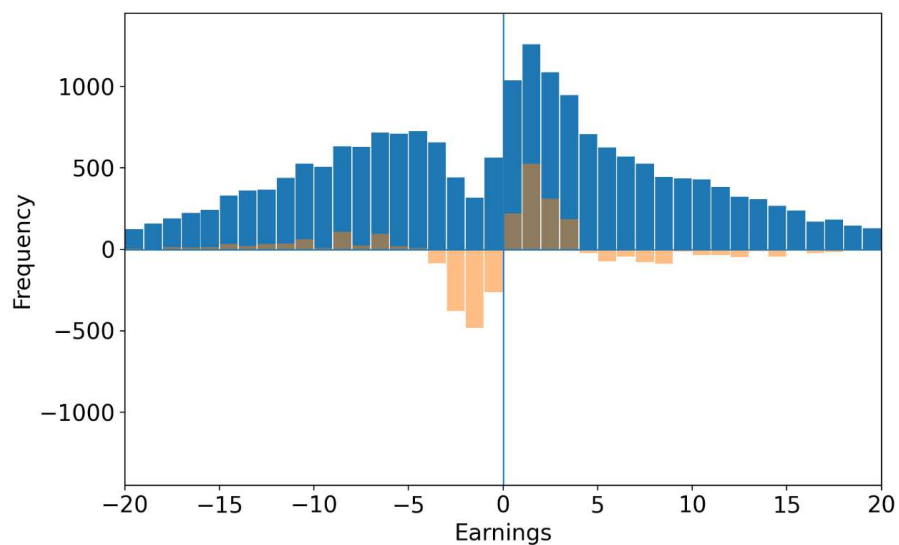
In Figure A1, the probability of detection curves is plotted against the level of illegal manipulation: each curve has different sensitivity (detection rate) parameters  $\gamma$ .



**Figure A1.** Probability of detection

### REPORTED AND LATENT EARNINGS

The baseline scenario (without tax evasion manipulation) is presented in Figure A2. The distribution of reported earnings is shown together with the difference between latent and reported earnings in period 1.



*Note:* the distribution of reported earnings is shown in blue, the difference between the distributions of latent and reported earnings is shown in orange.

**Figure A2.** Simulated distribution of reported earnings: baseline scenario

## APPENDIX B

### MODIFIED JONES MODEL

Table B1 presents the modified Jones regression for total accruals.

**Table B1.** Modified Jones regression

Variable	Coefficients
Constant	0.061***
REV-REC	0.020**
PPE	-0.038*
Administrative and support services	-0.001
Construction	-0.049***
IT and telecommunications	0.002
Manufacturing	0.007
Professional, scientific, and technical activities	-0.056**
Real estate	-0.075***
Transportation and storage	-0.072***

*Note:* \*\*\* denotes significant coefficients at the 99% confidence level, \*\* – at 95%, and \* – at 90% confidence level.